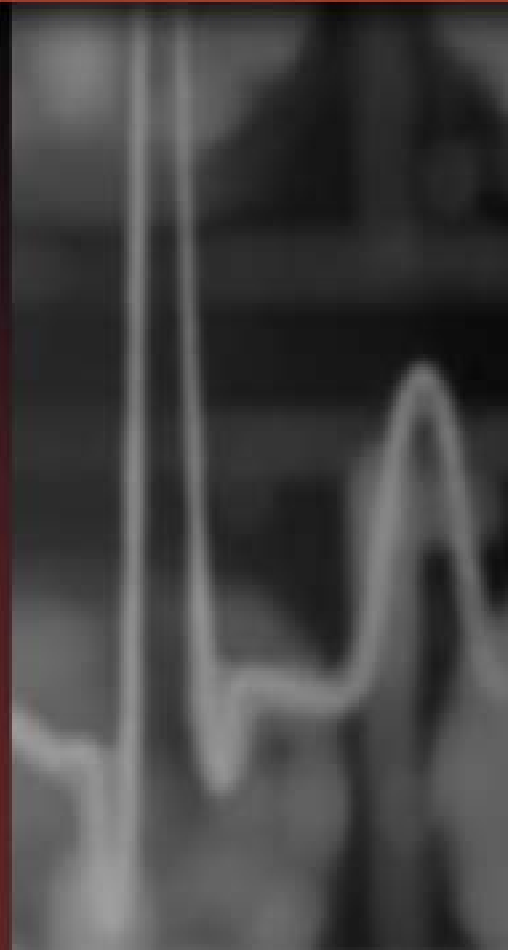
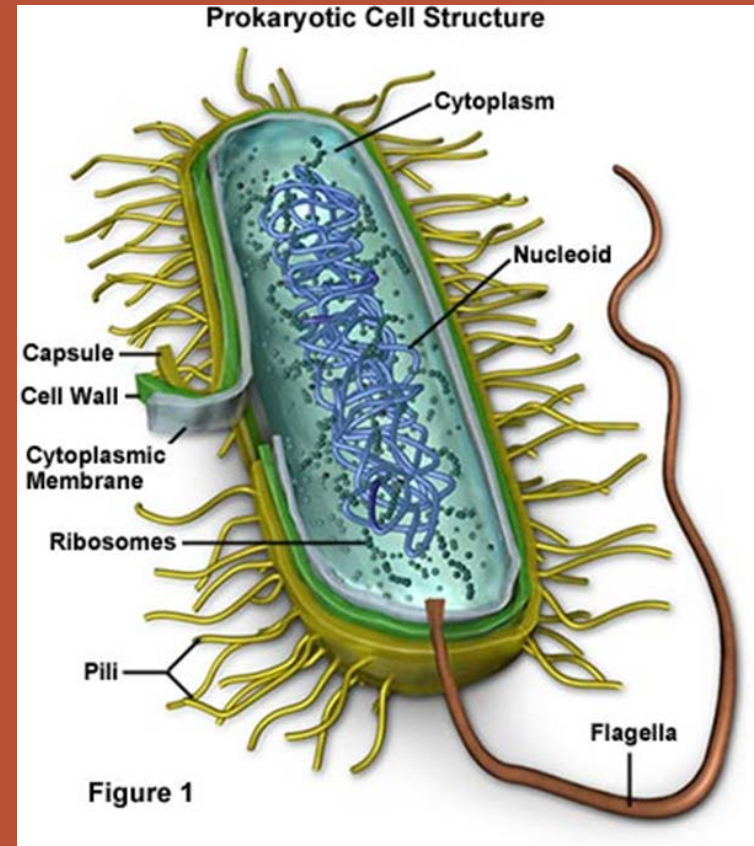


Introduction to Bacteria



General Structure

- <https://www.youtube.com/watch?v=fzIKJpcfXfo>
- 9 minutes long



General Structure

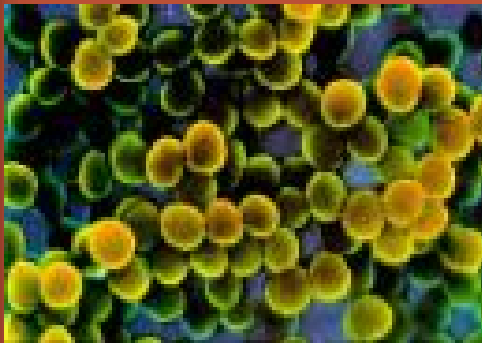
- Draw a typical bacteria cell and label the following, plus provide a brief explanation of the function for each part:
 - Cell wall
 - Cell membrane
 - Cytoplasm
 - Nucleoid
 - Ribosome
 - Flagella

Basic Shapes

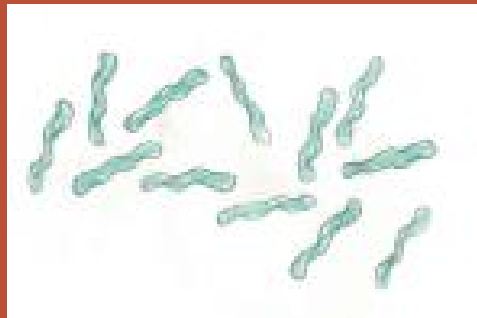
- Rod shaped called bacilli (buh-sill-eye)
- Round shaped called cocci (cox-eye)
- Spiral shaped
- Some exist as single cells, others cluster together



Bacilli



Cluster of cocci



Spiral



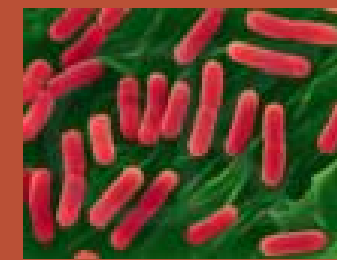
Cocci

Living Microbes

- Bacteria are alive
 - i.e. they display all characteristics of life:
 - Movement
 - Respiration
 - Sensitivity / stimuli
 - Growth
 - Reproduction
 - Nutrition
 - Excretion

Reproduction – Binary Fission

- Grow in number not in size
- Make identical copies of themselves by dividing in half
- Asexual reproduction
 - No exchange of genetic material



Reproduction – Binary Fission

Advantages

- Fast
- Little energy required
- Population growth can occur quickly

Disadvantages

- No diversity
 - Less diversity means less likely to survive long-term
 - Why?

Reproduction – Binary Fission

- <https://www.youtube.com/watch?v=7Lh-M-rX86Q>
- **Asexual**
 - <http://www.youtube.com/watch?v=3cD3U2pgb5w>
- **Binary Fission – how fast?**
 - <http://www.youtube.com/watch?v=gEwzDydcIWc>

Reproduction – Conjugation

- Sexual reproduction
 - Adds variation among bacteria
 - Why is this a survival adaptation?

Transduction

- Transduction
 - Not sexual reproduction
 - Does add variation
 - How might this be an adaptation?

Conjugation & Transduction

- <http://www.youtube.com/watch?v=7stZk6TesKk>

What is a pathogen?

- Bacteria that make you sick
 - Why do they make you sick?
 - To get food they need to survive and reproduce



- How do they make you sick?

- They produce poisons (toxins) that result in fever, headache, vomiting, and diarrhea and destroy body tissue



What are some common pathogens?

- Pathogenic *E. coli* (like O157:H7)

- Found in ground beef, contaminated fruits and vegetables



E. coli
O157:H7

- *Salmonella*

- Found in raw meats, poultry, eggs, sprouts, fruit and vegetables



Salmonella

- *Listeria*

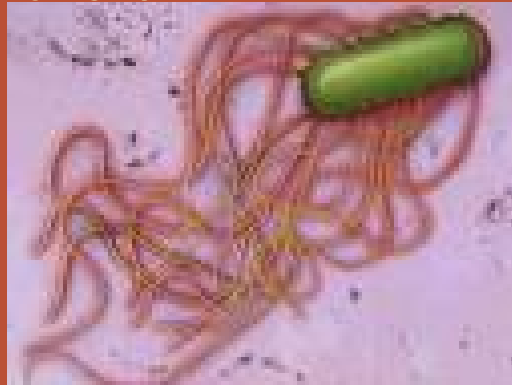
- Found in deli foods, lunch meats, smoked fish and vegetables



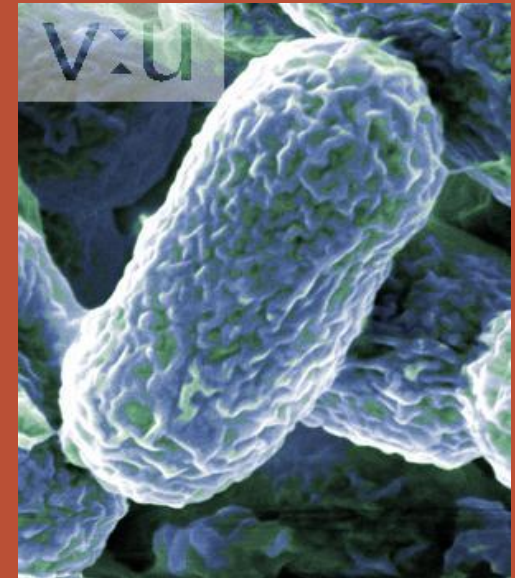
Listeria

Examples of Pathogens

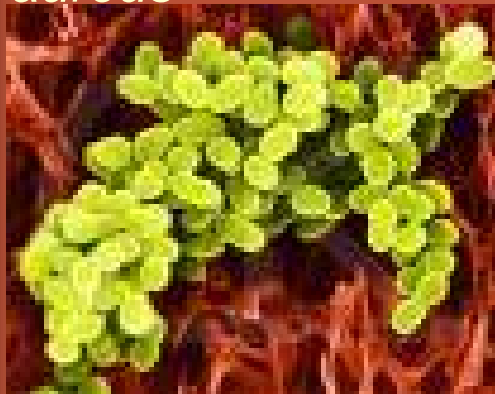
Salmonella



E. coli O157:H7



Staphylococcus aureus



What shape are these bacteria?
Cocci, bacilli, or spiral?



Campylobacter jejuni

How can I avoid pathogens?

- Antibacterial soap, wipes, foam, etc.
 - Meant to kill bacteria in various ways
 - Alcohol destroys cell membranes and proteins

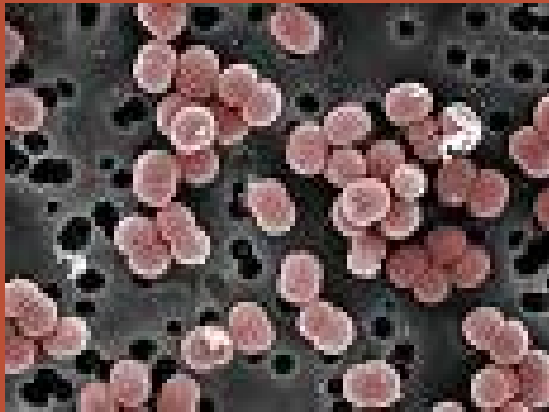


How can I avoid pathogens?

- **Cooking food**
 - Endospores can protect bacteria from heat
- **Cold food storage**
 - Delays bacteria growth, but doesn't eliminate it
- **Aseptic techniques**
 - Common laboratory practices



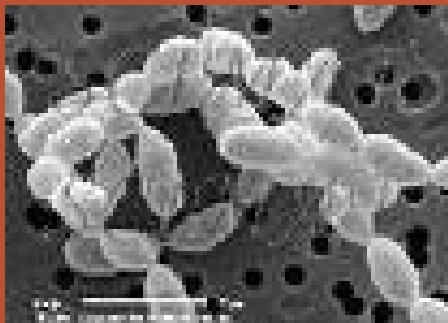
A Closer Look – Helpful Bacteria



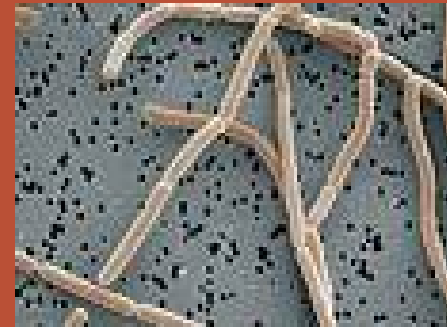
Pediococcus - used in production of fermented meats



Lactobacillus casei – found in human intestines and mouth to improve digestion



Leuconostoc cremoris –
used in the production of buttermilk and
sour cream



Lactobacillus bulgaricus –
used in the production of yogurt

Review

- **Bacteria are microbes**
 - **3 basic shapes**
- **Reproduction**
 - **Binary fission**
 - **Conjugation**
- **Transduction**
- **Bacteria are everywhere**
 - **Many are essential for life on Earth**
 - **Many live in symbiotic relationships**