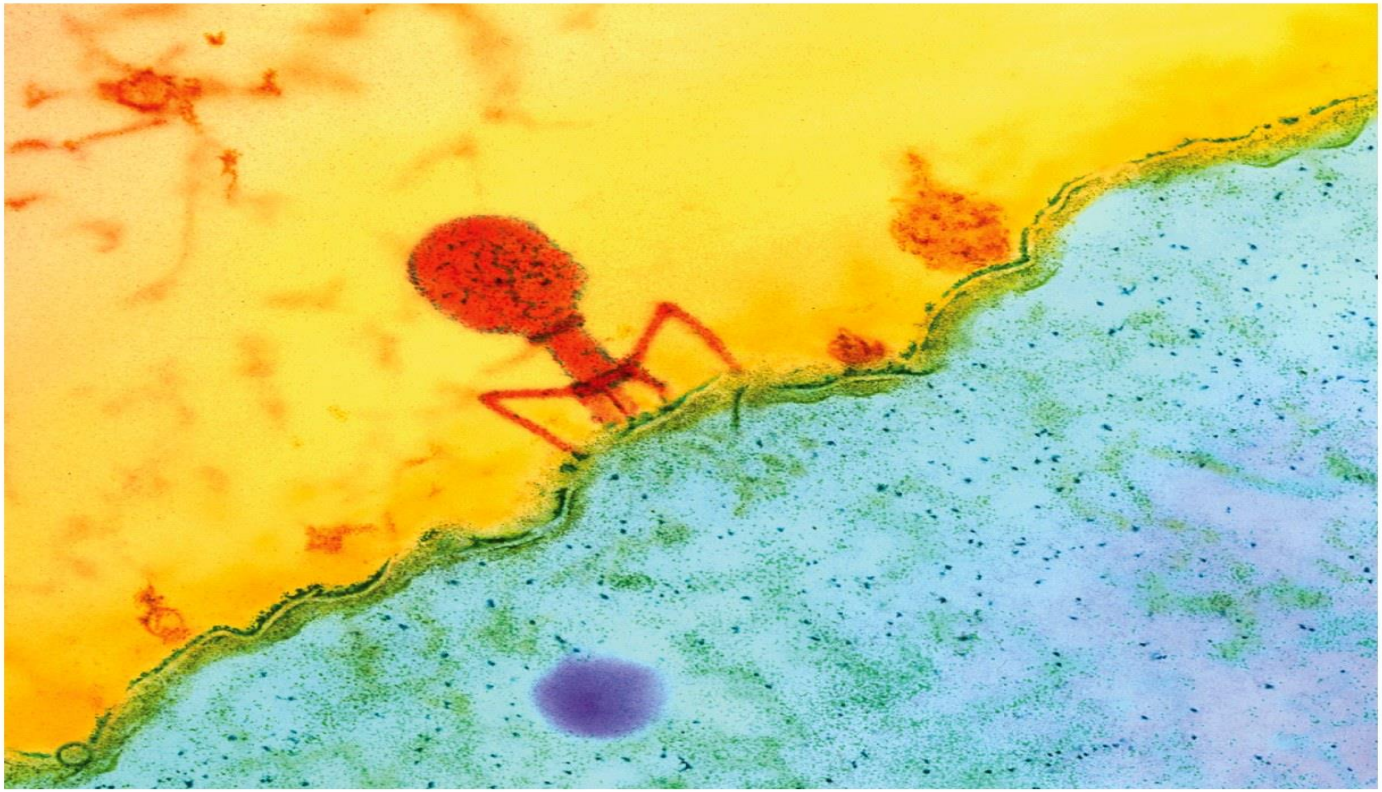
Chapter 13: Evolution and Diversity Among the Microbes



Chapter 13 Opener
***What Is Life? A Guide To Biology*, Second Edition**

Bacteria, archaea, protists, and viruses: the unseen world

Lectures by Mark Manteuffel, St. Louis Community College

Do Now:

- What is the name for bacterial reproduction and how do bacteria reproduce?

- Genetic diversity is the degree of difference between individuals in one population.
- Describe the genetic diversity of a population of asexually reproducing bacteria.

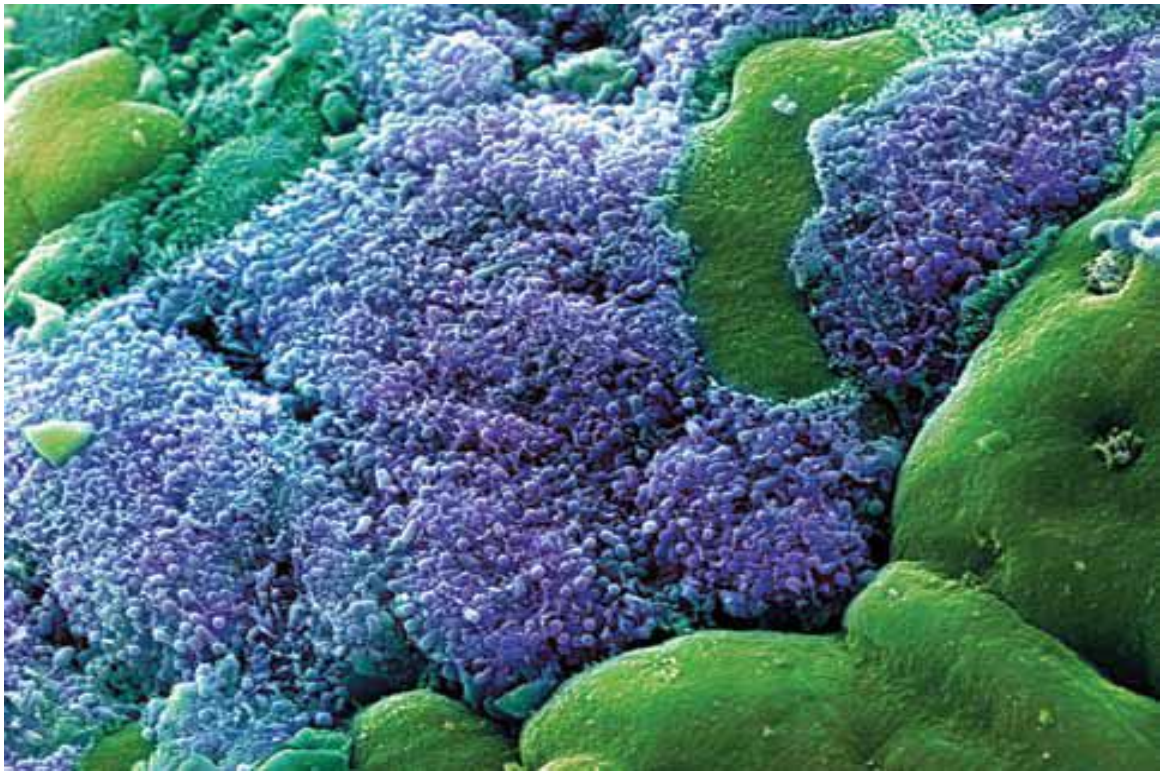
Do Now:

- Complete the worksheet provided and turn in to bin.
- Have your summaries for 13.3-13.8 on your desk.

DO NOW

- Turn in Peptidoglycan homework.
- Rewrite the following statements in your own words.
  - Bacteria sometimes carry the genes for specialized traits on small DNA molecules called **plasmids** that can be transferred from one bacterial cell to another by conjugation.
  - DNA can also be transferred laterally between bacterial cells by transduction or transformation.

13.6–13.9
In humans, bacteria can have harmful or beneficial health effects.



13.6 Many bacteria are beneficial

Many bacteria are beneficial. Those living in yogurt, for example, can take up residence in your digestive tract and improve your extraction of nutrients from food.

Figure 13-10
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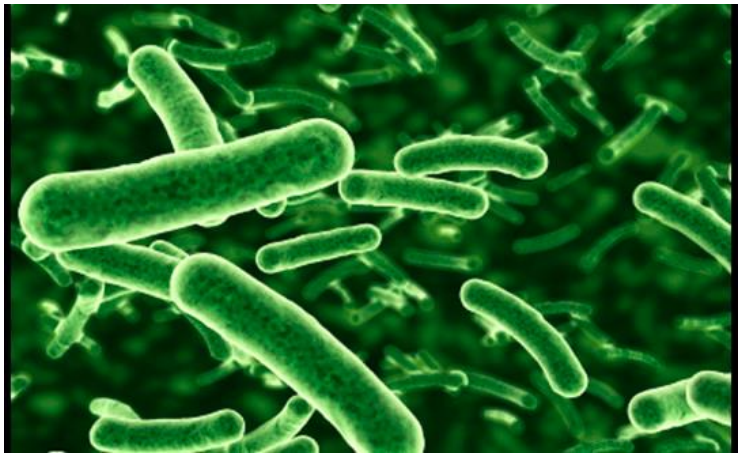
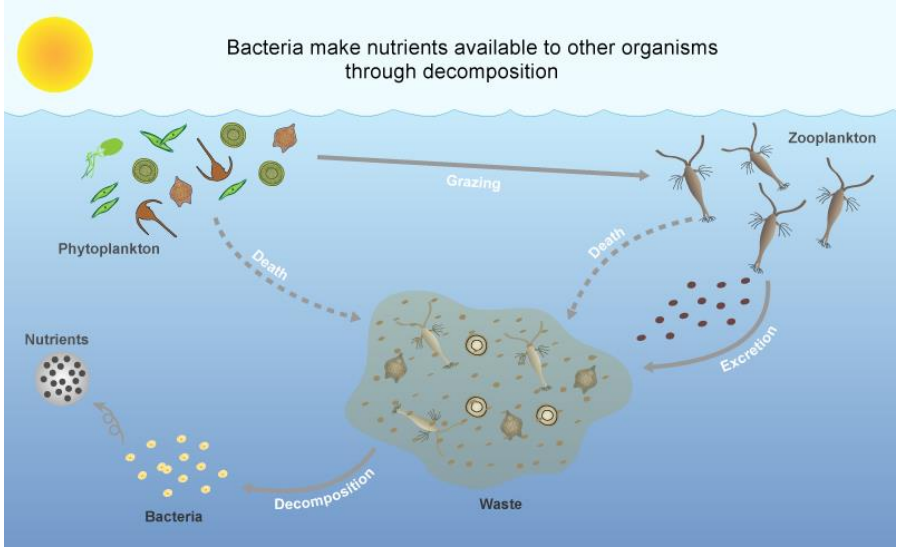
You owe your life to bacteria?

- Normal flora
  - Bacterial competition
- Probiotic therapy
  - Lactobacillus acidophilus

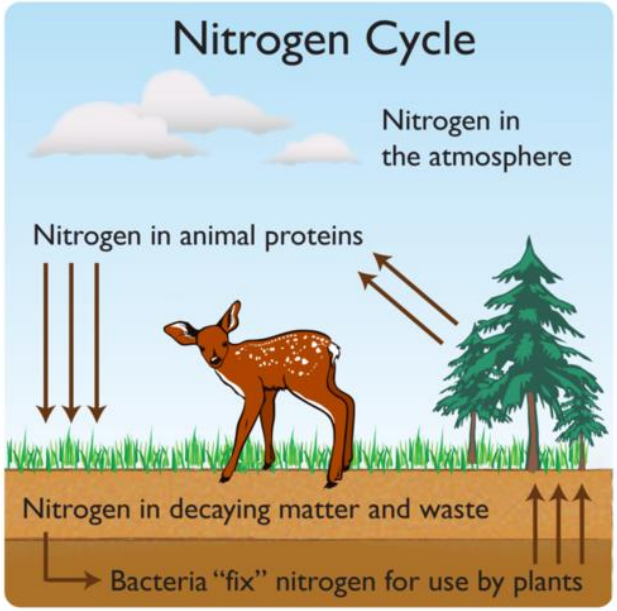


The Good!

- Bacteria are also beneficial to us
  - Decomposers
    - Recycle nutrients from waste



  - Nitrogen fixers
    - Fix nitrogen – allowing nitrogen to continuously cycle through the environment



Take-home message 13.6

- Your body fights bacteria with bacteria.
- A disease-causing bacterium must colonize your body before it can make you sick, and your body is already covered with harmless bacteria.
- If the population of harmless bacteria is dense enough, it will prevent invading bacteria from gaining a foothold.

13.7 Bacteria cause many human diseases.

Pathogenic bacteria

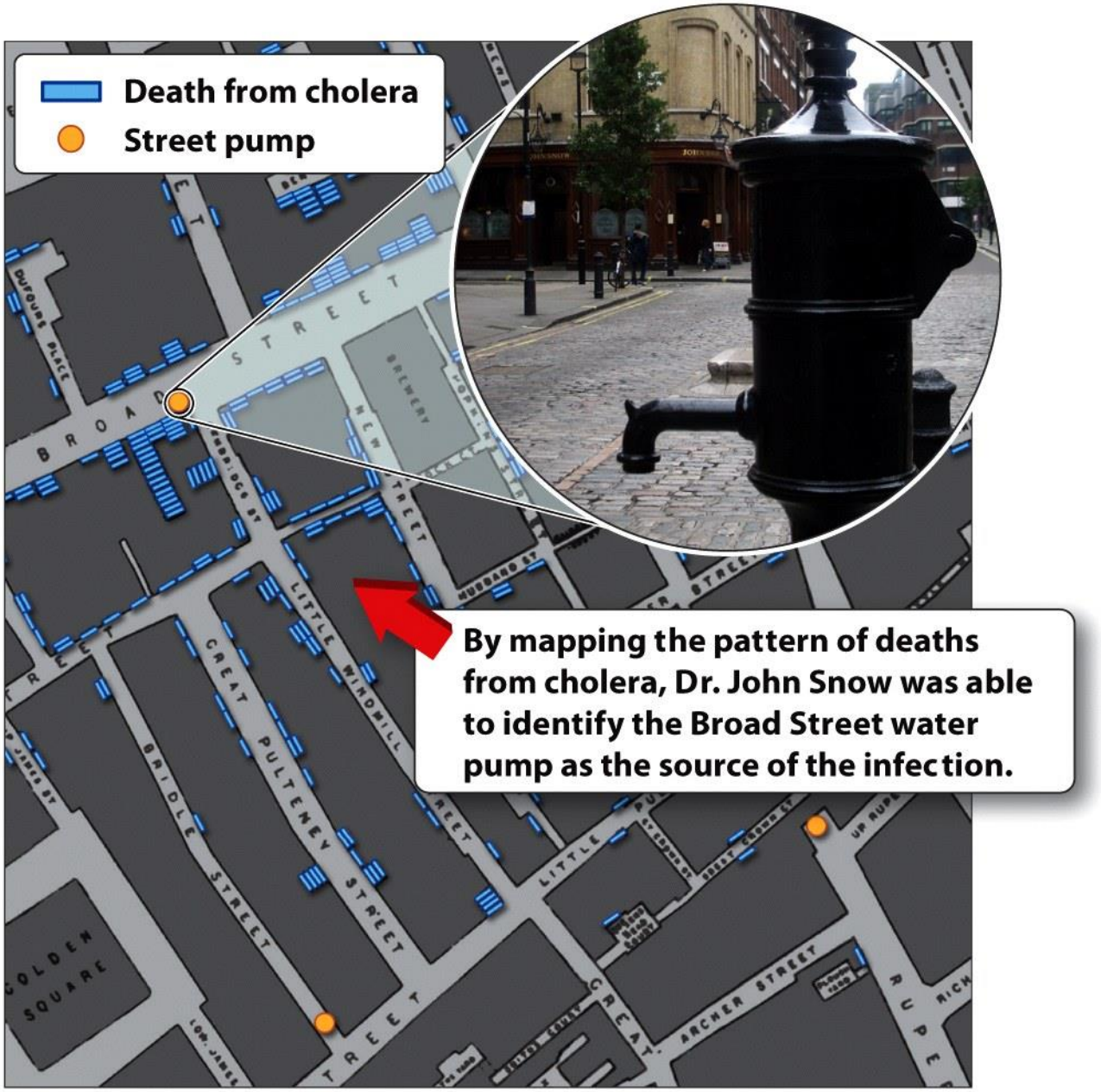


Figure 13-11
What Is Life? A Guide To Biology

What causes us to get sick from a specific type of pathogenic bacteria?

1. Lack of competition for food and space by bacterial strains that normally inhabit our body.
2. We have been exposed to a pathogenic bacteria (like cholera).
3. A pathogenic bacteria has entered our body through a break in the skin.
4. 1 and 2
5. All of the above

Take-home message 13.7

- Some bacteria always cause disease and others do no harm except under certain conditions.

- For example, *Streptococcus pyogenes* can be harmless, but under some conditions, it releases toxins that are responsible for strep throat, scarlet fever, and necrotizing fasciitis (caused by the flesh-eating strains).

13.8 Bacteria's resistance to drugs can evolve quickly.

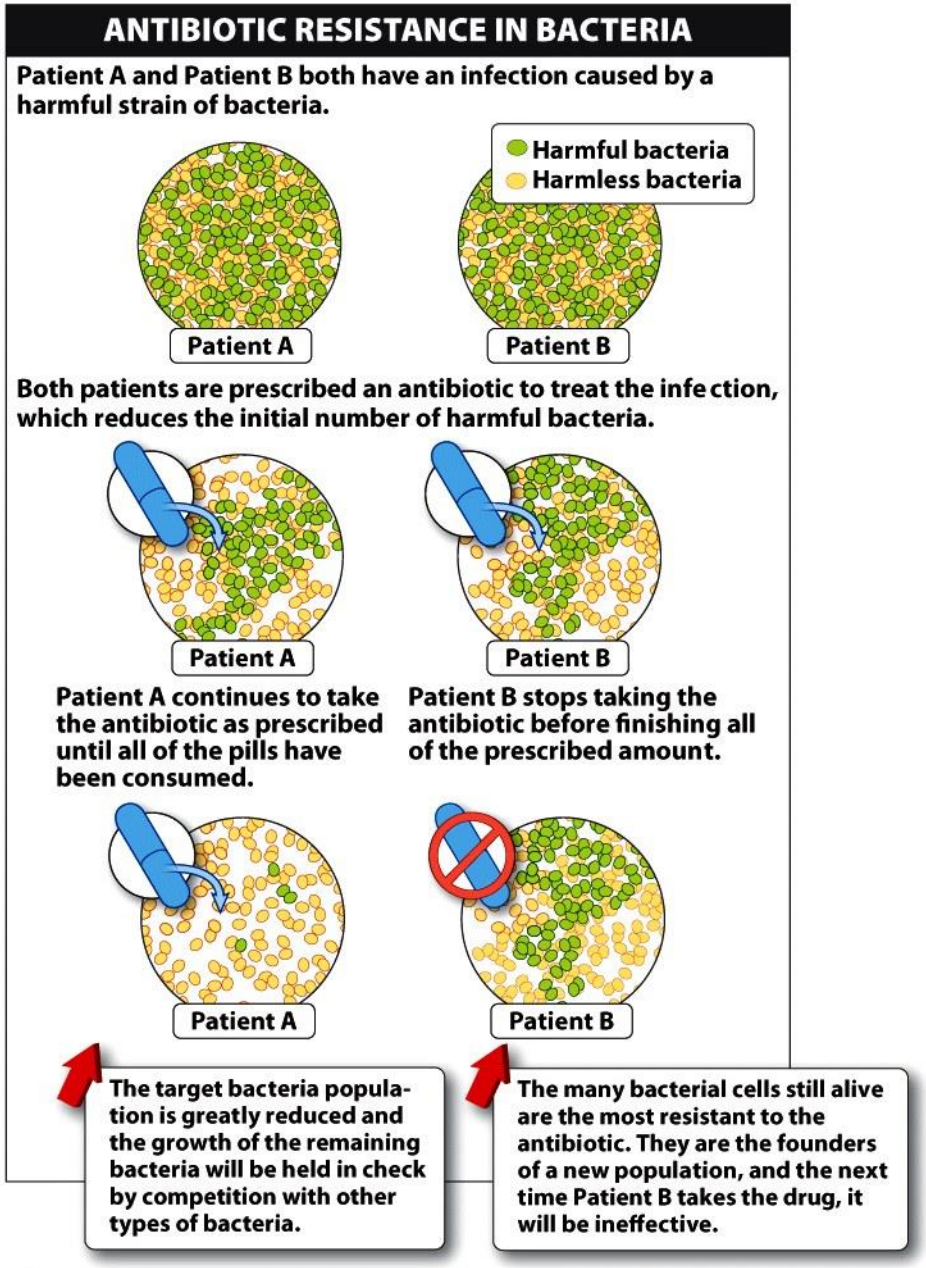


Figure 13-13

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