Digestive System Bacteria

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Learning Objectives

• Explain the roles of helpful bacteria in the digestive system.

Why eat yogurt?

Yogurt is a good source of calcium. Yogurt also contains active cultures of "good" bacteria. Foods that contain these beneficial bacteria are sometimes called "probiotic."

Bacteria in the Digestive System

Your large intestine is not just made up of cells. It is also an ecosystem, home to trillions of bacteria known as the "gut flora" (Figure 1.1). But don’t worry, most of these bacteria are helpful. Friendly bacteria live mostly in the large intestine and part of the small intestine. The acidic environment of the stomach does not allow bacterial growth.

Gut bacteria have several roles in the body. For example, intestinal bacteria:

• Produce vitamin B12 and vitamin K.
• Control the growth of harmful bacteria.
• Break down poisons in the large intestine.
• Break down some substances in food that cannot be digested, such as fiber and some starches and sugars. Bacteria produce enzymes that digest carbohydrates in plant cell walls. Most of the nutritional value of plant material would be wasted without these bacteria. These help us digest plant foods like spinach.

![Figure 1.1](image)

A wide range of friendly bacteria live in the gut. Bacteria begin to populate the human digestive system right after birth. Gut bacteria include \textit{Lactobacillus}, the bacteria commonly used in probiotic foods such as yogurt, and \textit{E. coli} bacteria. About a third of all bacteria in the gut are members of the \textit{Bacteroides} species. \textit{Bacteroides} are key in helping us digest plant food.

It is estimated that 100 trillion bacteria live in the gut. This is more than the human cells that make up you. It has also been estimated that there are more bacteria in your mouth than people on the planet. There are over 7 billion people on the planet.

The bacteria in your digestive system are from anywhere between 300 and 1000 species. As these bacteria are helpful, your body does not attack them. They actually appear to the body’s immune system as cells of the digestive system, not foreign invaders. The bacteria actually cover themselves with sugar molecules removed from the actual cells of the digestive system. This disguises the bacteria and protects them from the immune system.

As the bacteria that live in the human gut are beneficial to us, and as the bacteria enjoy a safe environment to live, the relationship that we have with these tiny organisms is described as mutualism, a type of symbiotic relationship.

Lastly, keep in mind the small size of bacteria. Together, all the bacteria in your gut may weight just about 2 pounds.

**Summary**

• Your large intestine is home to trillions of bacteria.
• Bacteria in the large intestine have important roles, such as producing vitamins and controlling the growth of harmful bacteria.

**Explore More**

Use the resources below to answer the questions that follow.
Explore More I

- Gut Bacteria: We Are What We Eat at http://www.youtube.com/watch?v=QwTOI5YoqrA (3:56)

1. How do bacteria influence our digestion?
2. What two categories, with regard to gut bacteria, have scientists identified?
3. What link do scientists believe may exist between gut bacteria and disease? Why is this an area of interest for scientists?

Explore More II

- Our Microbes, Ourselves at http://www.youtube.com/watch?v=zPO8-M_rcUo (3:07)

1. How may clean environments affect the microbes in our bodies?
2. How do gut microbes compare between host species (the species they live in)?
3. What do the findings presented here say about gut bacteria and their host?

Review

1. What is the gut flora?
2. Identify two roles of helpful bacteria in the intestine.
3. When you are sick, you might be given an antibiotic to kill harmful bacteria. Antibiotics cannot distinguish between "good" and "bad" bacteria, however. Why might this be a problem?
4. What type of symbiotic relationship do we have with these bacteria?

References

1. Photo by Eric Erbe, digital colorization by Christopher Pooley, both of USDA, ARS, EMU. This image shows the vast number of bacteria in your intestines. Public Domain