FOREARM FUNGUS
MALASSEZIA FURFUR
This fungus lives on the skin of many animals, including humans, where it feasts on the oils the skin produces.

GUT BACTERIA
LACTOBACILLUS
ACIDOPHILUS
These friendly bacteria help your body digest food. Without them, you wouldn't get as many nutrients from a meal.

ARMPIT BACTERIA
STAPHYLOCOCCUS
EPIDERMIDIS
When these common skin microbes build up in your armpits, they can cause a real stink!

FOOT FUNGUS
TRICHOPHYTON RUBRUM
This fungus thrives in the sweaty spots between your toes—and can lead to an itchy condition called athlete's foot.
THE BUGS ON US

Meet the bacteria, fungi, and mites that live on our bodies

Take a close look at your arm. What do you see? Skin, pores, and arm hairs. But what if you zoomed in 1,000 times? You’d see more than 1 million bacteria, fungi, and other teeny-tiny critters on a single square centimeter of skin. And that’s not the only place they live. Your body is teeming with 100 trillion microbes, or microscopic organisms. In all, these microbes outnumber our own body’s cells by a ratio of 10 to 1!

It may sound gross, but it’s a good thing you’re covered head to toe in microbes. Most of them are harmless hitchhikers feeding on your sweat, skin oils, and food as it digests in your stomach. Many are also important to your health. Collectively, all these creatures make up what is called the human microbiome.

“We have a rich community of microorganisms living all over our bodies,” says Lita Proctor, the project coordinator of the Human Microbiome Project for the National Institutes of Health in Bethesda, Maryland.

Until recently, we didn’t know exactly what kinds of microbes lived on us or what they all did. Since 2007, scientists working on the Human Microbiome Project have identified more than 10,000 different microbial species that live on—and inside—us. Not only is there great diversity, but each species stakes out particular spots on your body where conditions are just right for them.

MAPPING MICROBES

Microbes live on every part of the body that’s exposed to the air—even our lungs and stomachs! Since each body part has a specific ecosystem, microbes have created all sorts of niches. Similar bacteria dwell in damp places like armpits and behind the knees. Nostrils are home to viruses that infect the bacteria living there. About 80 types of fungi live on your heels. Mites nestle in eyelashes, eating dead skin and oil.

But even places with similar conditions can have drastically different resident microbes. The roof of your mouth is covered in different bacteria than your teeth. Your left hand’s microbes are different from those on your right hand, depending on which hand you use more often.

Our microbiome keeps us healthy, says Pat Schloss, a microbiologist at the University of Michigan in Ann Arbor. “We eat a lot of foods that our body can’t digest on its own. We need bacteria in our guts to break down things like fiber.”

Even *E. coli*, the bacteria that cause food poisoning, are vital to

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our bodies—as long as they stay in the lower intestine. *E. coli* bacteria produce vitamin K, which our bodies can’t make on their own.

Working with the body’s disease-fighting immune system, microbes are often the first line of defense against invading germs. Our microbes want to protect their foothold on our bodies.

“We are living in a sea of microbes, and yet we don’t get sick,” says Proctor. “Your microbiome is always on high alert.”

Based on what we are learning from the Human Microbiome Project, more doctors are turning to microbes to fight intestinal infections. For example, they can now transplant healthy people’s feces to sick patients to help restore an ailing gut microbiome.

**GROWING WITH US**

Why don’t our immune systems zap these friendly microbes? Between birth and age 3, our immune system and microbiome develop together. The immune system recognizes our microbes as just another part of us.

Your microbiome is so unique that it’s like a fingerprint. People living in the same house have similar microbiomes, but not classmates or friends. Even though you spend every day at school together, you won’t swap as many microbes with friends as you do with your family members.

Scientists still aren’t sure what makes up a healthy microbiome. Schloss recently studied data from about 300 healthy subjects and found a wide range of microbial diversity. “What we see is that there really is no one normal microbiome,” says Schloss. “We are all different. And that’s fine.”

—KATHRYN FREE

SOURCE: JULIE SEGRE, NIH
COMPARING POPULATIONS

The “Body Bugs” diagram to the left shows the breakdown of three types of microbes—bacteria, fungi, and viruses—found on different parts of the human body. You can compare the populations of each body part’s unique microbe distribution to draw conclusions about where certain microbes are likely to thrive.

Use the data to answer the following questions and draw inferences about your body’s microbe populations and where they live.

1 Which of the human body parts on the chart have the largest percentage of bacteria?

2 Which has the smallest percentage of viruses?

3A Which body part has the highest percentage of viruses?

B Can you think of a reason why this might be the case?

4 Where on the human body will you find a distribution of microbes very similar to that behind the knee? Explain your answer.

5 Where will you find a distribution of microbes very dissimilar to that on the toenail? Explain your answer.

6A On average, there are about 1 million microbes per square centimeter of skin on your cheek, about how many bacteria can you expect to find?

B About how many more viruses than fungi would you expect to find in the same area?

7 How many more bacteria are you likely to find on a square centimeter of your toenail than on the same area of your forearm?

8 Based on the “Body Bugs” diagram, which type of microbe do you think is most present on your body?