

## Exploring the human body biome



In the section [Map of the human microbiome](#), you were introduced to a variety of environments throughout the human body that microorganisms inhabit. However, there is much more to be learned about each of these different locations than is discussed on this site. Now you have the opportunity to explore the ecosystems of your body and share your findings with your classmates. Working in groups of 3-5 people, pick one of the following sites of the human body where microbes are found:

- Skin
- Mouth
- Nose
- Gastrointestinal tract
- Urogenital tract

You should first seek out information about your chosen environment that answers the following points:

- *What is your environment like? Describe the physical conditions of the environment such as dryness, pH level, and chemicals found there. Explain how these physical conditions may pose a challenge to the microbes that live there.*
- *Who lives there? Describe the microbes (including bacteria, archaea, eukaryotes, and viruses) commonly found in this environment in a healthy person.*
- *How did they get there? Describe how the bacteria that live in your environment originally got there. Were they transmitted from a person's mother at birth? Did they come later in life?*
- *What are the microbes doing? Describe the special adaptations that these bacteria have to survive in their unique environment. What sorts of metabolic processes are these bacteria carrying out that effect the human body? For example, do they make vitamins that can be used by people? Do they secrete compounds that inhibit the growth of pathogenic bacteria? Do they effect drug metabolism?*
- *What are some of the illnesses/conditions associated with the microbial community in your environment? Describe how the microbial community promotes the development of the disease and how the disease might be remedied (keeping the microbial population in mind).*

Once you have collected all of this information, prepare a description of your findings in the following formats

- A scientific field report discussing your findings, making sure to address all of the points above and citing relevant sources,
- Create an infographic poster to summarize the findings above for your classmates. As an infographic, the majority of your poster should be images with minimal text. An example of what your infographic could look like is shown below.

# THE HUMAN MICROBIOME & THE EVOLUTION OF YOU

## Your Life

**Fertilized Egg**  
Over 23,000 genes inherited from both your mother and father

**Baby**  
You are born sterile and your first acquisition of microbiota is inherited from the birth canal. If you were breastfed, you received over 700 species of bacteria.

**Child**  
It takes 1-2 years to develop adult microbiota. As you develop, your diet and environment impacts the proportion and presence of the microbiome.

**Adult**  
As you age, the activity of the microbiome changes. An adult harbors more than 100 trillion bacteria.

## A Bug's Life

**The Beginning of an Ecosystem**  
The Human Microbiome defines a collection of microorganisms within your own body. Trillions of microbes (bacteria, viruses, fungi and protozoa) reside on the surface and in deep layers of the skin, especially in the nose, mouth, gut and genitals.

**Your Environment**  
The microbiome has an intimate connection to the environment in which you are raised.

**The Microbial "Organ"**  
Microbial cells are one-tenth to one-hundredth the size of a human cell and may account for up to five pounds of body weight in a healthy adult. The microbiome is an organized system of cells with as much impact on the body as the heart, liver or immune system.

**99% of Microbes are Beneficial**  
Microbes assist with digestive activity, vitamin synthesis, immune system function and protection from pathogens.

## GOOD TIMES

You scratch my back and I'll scratch yours. In exchange for raw materials and shelter, we'll keep the peace.

## BAD TIMES

Common interests break down. Illness results when the microbiome is out of balance.

- The human microbiome is medically accessible and manipulable in ways the human genome is not.
- Microbes have a significant impact on digestion, metabolism, neurology and immunology.
- Microbiome ecology assists with down regulation, reducing inflammation, and colonization resistance against pathogens (CRAP).
- Immune cells live in the gut wall and distinguish friendly from unfriendly bacteria.
- Parasites can help with the maintenance of healthy tissue.
- A disturbance in the immune system opens the way for a normally benign microbe to become a disease-bearing organism.
- The overuse of antibiotics are increasing antibiotic resistance among microbes.
- The average child in the developed world receives 10-20 courses of antibiotics before they turn 18, creating a fertile environment for opportunistic pathogens.
- Many diseases have been correlated with a microbiome imbalance, such as IBD, Crohn's Disease, obesity, autism, pediatric allergy and autoimmunity.

Stay Healthy

Tend Your Microbial Garden

Get Healthy

Contact Energetix to learn more about Medical Ecology and gut health.

Take Prebiotics and Probiotics

Nurture the invisible ecosystem of your body

Stress Less

Breathe Fresh Air

Limit Antibiotic Use

Add Plant-Based Enzymes to Your Diet

Eat Healthier

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