

1. What is a microbiome?

Microbes are extremely tiny organisms that must require a microscope to view them. These include bacteria, fungi, and archaea.

The term "microbiome" describes all microbes. It is the entire collection of genes.

2. What part of the body is home to the most diverse population of microbes?

The human body houses the most diverse types of microbes, such as bacteria, archaea, fungi, protists, viruses, and microscopic animals. Similar as humans live on earth, these microbes live within us.

3. Why do different parts of your body have different microbial communities?

The unique environments and resource availability of our body parts greatly affects what kind of microbes we house. For example, our mouth has nutrients, oxygen, and water molecules, and will house microbes that rely on them.

4. Who gave you your first set of microbes?

My mother gave me my first set of microbes as soon as I leave her womb. These microbes are very useful for babies as one of their function includes digestion.

5. Why do our microbiomes change as we get older?

As humans grow up, the environment of our body changes as well as microbes living within it. For example, as the surface area of our bodies increases, the population of microbes also increases. Throughout time, our microbiomes learn to become more stable. During events such as illness, microbes will change to adapt with the new environment. During old age, the population of microbes decreases as they die off.

6. Why do microbial populations vary among individuals of the same age?

Among individuals of the same age, there are many other factors that impacts the microbial population, such as gender, diet, climate, hygiene, etc.

7. What is a disease related to microbes? How do microbes cause this disease?

One of the worst diseases with connections of microbes is cancer. Microbes can increase the risk of cancer with its inflammation. There are many direct correlations between the microbes and cancer itself. For example, H. pylori bacteria is a common cause of stomach cancer.

8. Microbes can also be helpful to us!

- a. How do microbes protect us from infection?

The genes of microbes can code for proteins that protects the human body from harmful bacteria. The population of microbes that live around our body offers a

biological shield against intruding bacteria. Microbes also aid in developing an immune system. The gut microbes, for example, produces antibodies against harmful substances.

- b. How do microbes help our brains develop?

Microbes are capable of commanding our brain cells to divide. They use the two important compounds: ARA and DHA, to create nutrients to aid with brain growth even during the early stages of life.

9. Microbes form symbiotic relationships with many organisms.

- a. How do microbes benefit herbivores?

Microbes can benefit an organism's nourishment and reproduction, as well as providing protection for it.

- b. Why does this benefit vary among different species of herbivores?

Different species of herbivores have different benefits from microbes due to their unique diets and living environments.

10. Sometimes we need to control a serious bacterial infection with antibiotics. Macrolides are a type of antibiotic. How does this type of antibiotic kill bacteria?

Macrolides prevent infectious bacteria from building proteins. Without the ability to produce protein, the bacteria cannot affect the organism and will die.

11. The overuse of antibiotics can cause resistance to evolve in a population.

What is the difference between acquired and intrinsic resistance?

Acquired resistance describes bacteria that gained the ability to resist antibiotics through genetic amendments or DNA transfers. Intrinsic resistance also describes bacteria resistance to antibiotics, but its resistance was gain naturally without modifications. For example, bacteria, without a cell wall, will not be killed by an antibiotic that specifically kills bacteria with cell walls.

12. What are two approaches used by healthcare providers to prevent antibiotic resistance?

- a. Doctors will prescribe a "broad-spectrum approach," a method that mixes different antibodies

to attack a specific bacterium. If one antibiotic does not work, then the other should.

- b. Doctors are more vigilant in prescribing antibiotics unless they are mandatory.